

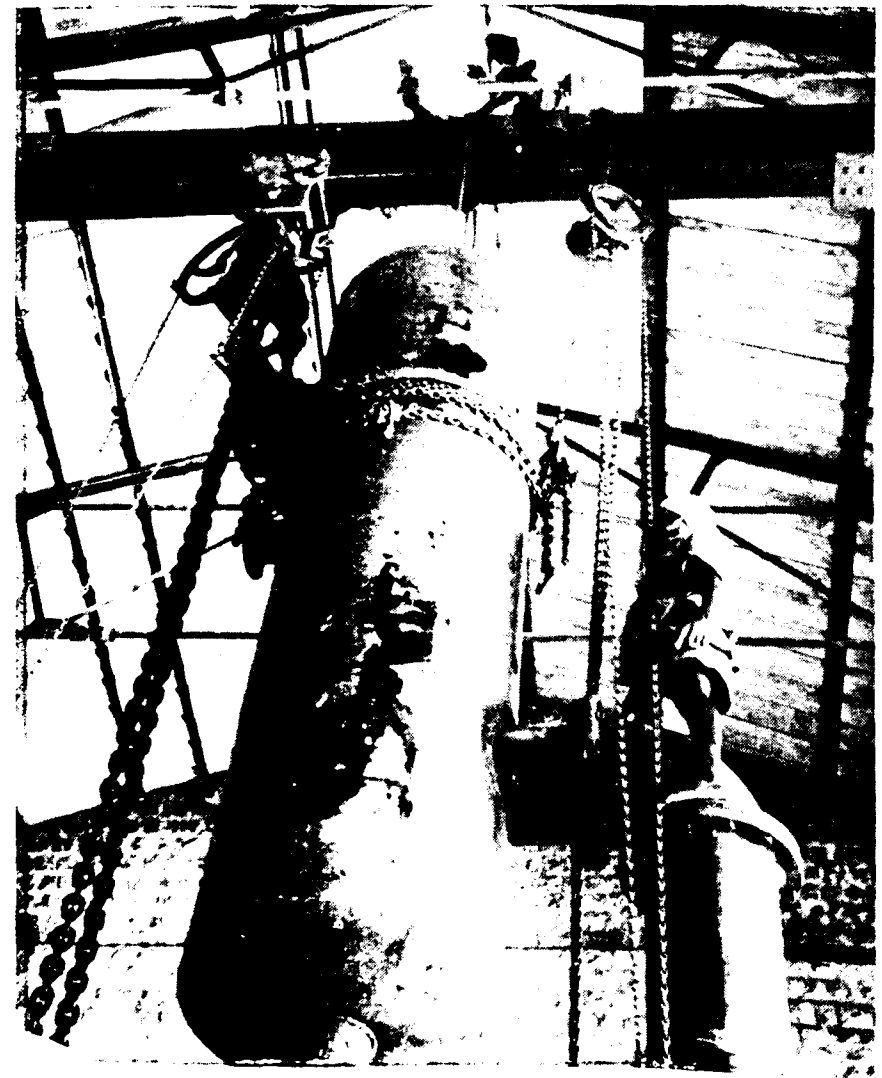
211

METKEM

Journal

211
2-12

37



36
XERO COPY
11/2/2001

178804

Day

Thank you for your letter, but...

A factor in limiting our cable output today — both A. C. S. R.
(Aluminium Cable, Steel Reinforced) and All Aluminium — has been the burden
set on industry by the over-riding needs of defence production,
in other parts of the world. The 'raw materials position'
is none too easy; still, we are confident of receiving our
requirements, at least to be able to take care of the orders
already placed with us — and that might yet be placed with us.

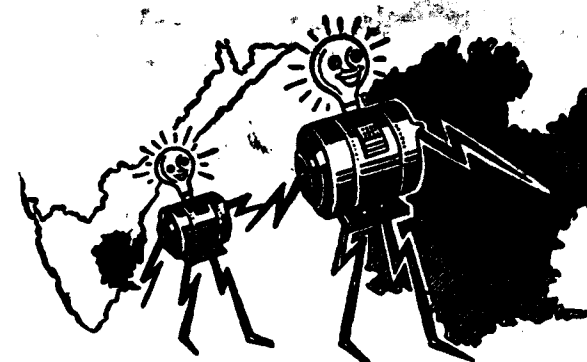
So, write us a line —

we'll reply you by 'cable' if possible!



THE ALUMINIUM INDUSTRIES LTD.,
KUNDARA

Managing Agents: Seshasayee Bros., (Travancore) Ltd.



"Lead, kindly light..."

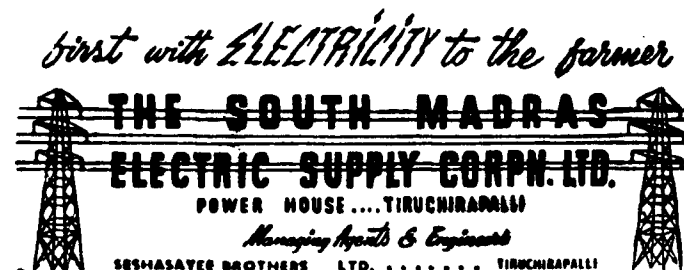
Madras leads, others follow... in rural electrification.
And, with pardonable pride, we may say, as pioneers, we blazed the trail...
lighted the way, in this part of the country.

As far back as 1930 — in fact, four years before the Madras
Grid was formed — we extended electricity to the country side.

We realised even then that more power to our villages meant more power
to the nation, that the farmer was ever India's keyman
and that providing him with electricity was a big step forward,
in national advancement.

Our rural programme naturally suffered a set-back, during the war years,
but still from 1940 onwards, again, ours is a consistently fine record,
and more and more villages have been electrified.

Despite present equipment shortages
we plan to extend electric service to even more rural people,
this year and next... and the years ahead!



THE FERTILISERS AND CHEMICALS

TRAVANCORE LIMITED

PREMIER MANUFACTURERS OF

AMMONIUM SULPHATE
SUPERPHOSPHATE
ANHYDROUS AMMONIA
SULPHURIC ACID
CARBON-DI-OXIDE.

Factory and Registered Office:

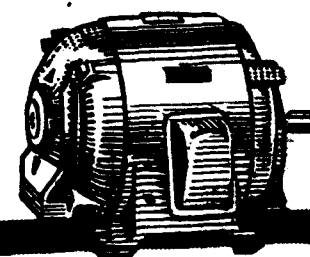
UDYOGMANDAL
TRAVANCORE—COCHIN

Managing Agents:

SESHASAYEE BROTHERS (TRAVANCORE) LTD.

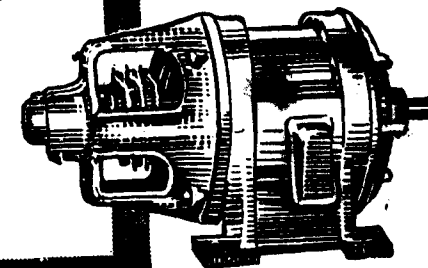


AMERICAN ELECTRIC MOTORS



SQUIRREL CAGE, DRIP-PROOF
MOTORS—The most economical
constant speed Induction Motor for
Industrial use
(From 1 H. P. upto 20 H. P.)

WOUND ROTOR (SLIP-
RING) MOTORS — Open
Type—Heavy duty construc-
tion—High starting torque
and low starting current.
(From 20 H.P. upto 50 H.P.)



ALLIS CHALMERS—one of
the World's Big Three in
the manufacture of Electrical
Machinery.

ALLIS CHALMERS Motors
are built for heavy duty jobs.

Motors of all types
available to suit
every type of
drive.

THERE IS AN ALLIS CHALMERS MOTOR TO MEET
EVERY MOTOR APPLICATION PROBLEM.

Eason Engineering Co. Ltd.

5-7, SECOND LINE BEACH, MADRAS-1.



METKEM

Issued by the Mettur Chemical & Industrial Corporation, Ltd.

Vol. IV

JAN - FEB 1952

No. 1

Editorial Board:

S. RAMASWAMY

R. NATARAJAN

K. RAMNATH

T. M. KRISHNA RAO

P. B. SRIRANGAN

C. S. SRINIVASAN

R. PARTHASARATHY

EDITOR

PHOTOS: K. RAMNATH

IN THIS ISSUE

Sarvodaya	.. 5
Consumer Research	.. 6
Moving Electrolyte - Filter	
Diaphragm Type Chlorine -	
Caustic Electrolysers	.. 9
For this relief - Much thanks	.. 14

IN EVERY ISSUE

Personnelia	.. 15
Metkem News	.. 19
Chemical Briefs	.. 23
Sportfolio	.. 25
Library Corner	.. 32

The Cover:

Positioning of the Barometric
Condenser in the Swenson
Evaporator Vacuum System.

தமிழ்ப் பகுதி

வேலைக்கேற்ற குணங்கள்	 34
மஹாத்மா காந்தியின்	
வாழ்க்கையும் போதனைகளும்	 37

The views expressed in METKEM are not necessarily those of the Editorial Board



Metkem

A JOURNAL DEVOTED TO THE HEAVY CHEMICAL INDUSTRY

SARVODHAYA

January 30 was **Sarvodaya** Day. The day was observed with quiet sadness throughout the country.

Four years ago, an assassin's bullet claimed the life of the Mahatma. He died, as he lived, for others.

Gandhiji's death is too poignant a tragedy for us ever to forget. Even without the stimulus of formal observance we, of this generation, would not willingly let die the memory of his end. But would that do?

That it is hardly possible for most people to lead Gandhiji's dedicated life is a battered truism. Why, then, do we observe his death anniversary? Merely to remind ourselves that such a one as Gandhi trod this earth, as Jesus and the Buddha did before him?

No; that would be but half-grasping the significance of **Sarvodaya**, not fully comprehending it.

Sarvodaya is, also, a reminder for us to lead better lives, better not in a Marxist, materialistic sense, but rather in a spiritual sense, to dedicate ourselves anew to service to fellow-men. Because of constant repetition, sentiments like these unfortunately tend to sound trite. Nevertheless, the hard core of substance that these expressions carry, cannot be gainsaid.

Gandhiji "scorned his flesh and fleshly bonds, yet saw his brother's bleeding wounds."

It might not be possible for most of us to scorn our own flesh, but Gandhiji would have lived—and died—in vain, if we merely passed by a bleeding brother; if we did not kill all ignoble impulse; and if we strayed from the paths of love and devotion and duty that he had set for us.

An annual dedication, then, is the chief purpose of **Sarvodaya**.



Consumer Research

by
K. K. RAMAN *

ANY business or industry, which hopes to make a profit, must constantly strive to produce goods at the lowest possible price without detriment to quality. It is, therefore, necessary that a businessman should make a deep and continuous study of the several features that go into the making of an article. He should, also, study how the standard of his article compares with that of others, whether demand for it is growing or diminishing, whether the public is willing to accept it, on his terms, or in other words, whether there is a favourable "consumer response" for his product. If a businessman thinks that he can put his house in order by "trial-and-error" methods, he is in for an expensive course of education.

Gone are the days when a manufacturer can mass-produce an article speculatively, and trust to a corps of high-pressure salesman to push it. Today, he cannot hope to sell a product by such methods, except where it fulfills an unsatisfied demand. Marketing plans must be as scientific and comprehensive as production plans.

VARYING TECHNIQUES

To understand public demand, fully, industry needs consumer research. The

ways and means of ascertaining the likes and dislikes of a community for an article like a toilet soap are far different from those required for a technical or chemical product, for the reason that, in the second instance, the mental reservations and predilections of the individual user do not come into play. Consumer research has necessarily to vary with the article or product concerned. A chemical product like bleaching powder, for example, has a market only with those engaged in the manufacture of textiles and paper, and those concerned with water sterilisation and local sanitation. It has, therefore, only a specialised and limited market. On the other hand, articles like watches, soaps, wearing apparel, etc., where personal preferences predominate, the market is not so restricted.

The manufacturer of a specialised product has to familiarise himself with the requirements of different markets, whereas it will suffice, if the maker of a common article has a broad understanding of the tastes of the general public.

In the marketing of a technical product, again, emotional appeal is of little avail. It is moonshine to talk of the alluring appearance of a chemical! Neither can the advertiser appeal, here, to the vanity

of the owner or to his possessive instinct. "All the best people own XYZ Radio," might be all right for radio selling. In selling a chemical product, however, the manufacturer cannot hope to titillate the vanity of the potential buyer.

The consumers of chemical products are not interested in these products, as such, but only in the applications or the benefits these products can confer on them. The textile millowner, the paper manufacturer, the farmer and the *dhobi*—all look at chemical products through the window of the particular industry, business or profession, in which they are engaged. The needs of a specialised public have to be catered for, and advertising of the familiar type will not, therefore, answer the purpose of the chemical manufacturer. His publicity must be informative, and it cannot be informative, unless he understands the problems and peculiarities of the other industries.

Let us take, on the other hand, a consumer article like a fountain pen. In the manufacture of a popular pen, a great deal of investigation is called for on the likes and dislikes of different types of consumers. A representative sampling of the tastes of a cross-section of the community might be necessary, before the manufacturer decides upon the number of large and medium and fine-pointed pens he should produce, whether he should call his pen "life-time" and charge what might be to many a fancy price or whether he should place the accent on his moderate price and "underplay" the life of the pen.

7

NAME APPEAL

"There is no difference between one soap and another except perhaps in their advertising and perfuming," observes Fred Wakeman, in his best-seller, *The Hucksters*. Fred Wakeman produced his novel to satirise the extra-ordinary claims made for consumer articles in American commercial broadcasts. Most advertising might be done on the emotional plane, but the consumer is a rational being, capable of examining and assessing a product on its merits. So, unless a manufacturer tries to keep abreast with customer preferences, consumer likes and dislikes, he might soon be out of business.

It will thus be seen that the consumer research apparatus has to vary from product to product.

The importance of consumer research, particularly for popular items, cannot be over-estimated.

It is as a result of consumer research that manufacturers found out that for perfumes the public preferred suggestive names like MENACE, MY SIN, TABU, etc., and that the constant repetition of brand names of consumer goods in advertising helped the public to ask for what they required by name.

PACKAGING

It is consumer research, again, that established that packaging must be as attractive, as the product must be of high quality and low price. Before World War II, I had occasion to go to Japan,

* Mr. K. K. Raman is Director, Seshasayee Bros., Ltd., and the Director-in-charge of MCIC Ltd.

and I was amazed at the attention that Japanese shop-keepers paid to packing. No article was sold to a customer unless it was first put in an attractive case or carton which, again, was wrapped over with glazed paper and tied up neatly with silken threads and ribbons. Neither need the article be carried home by him; it would have gone in advance to greet him, as it were, on his return.

It is the sad experience of many in this country that they have not been able to find a market, even for good articles. The reason is to be found, for the most part, in indifferent packing. Packing not only protects an article from outside contamination but, also, ensures safety in handling. To mention one example—a consumer would sooner buy a medicine (even of doubtful efficacy) when presented properly than really good medicine, but packed indifferently and covered with ugly labels.

AFTER SALE SERVICE

Trade fairs, industrial displays and religious festivals are great opportunities for ascertaining consumer reactions. At such, the manufacturer meets his great

public "in the face." A vast, anonymous body acquires a new meaning for him, and he must not let slip the opportunity for studying public likes and dislikes. He must engage as many representative types as possible in subtle conversation, and try to find out from them, what their reactions are to his product, its standard and its price, and his distribution methods.

Any complaint made should be promptly investigated and, as far as practicable, set right.

One way of maintaining good relations with the consuming public is "free servicing" after sales. The manufacturer should not rest content with having placed his goods in the market, but should offer servicing at little, or low cost, to the customer during the stated period of the life of the product.

To conclude: No science laboratory or research institute can directly aid a manufacturer in finding out what the customer wants. For this, he should fully depend on his sales organisation which, in turn, should be in as close a touch as possible, with the consuming public.



R. V. Ramani

Moving Electrolyte -

FILTER DIAPHRAGM TYPE CHLORINE-CAUSTIC ELECTROLYSERS

THE electrolytic method of manufacture of chlorine and caustic soda is the most modern process for the production of these chemicals on an industrial scale. The principle is the passage of an electric current through a concentrated solution of sodium chloride. Sodium chloride breaks up into chlorine ions and sodium ions. The negatively charged chlorine ions travel to the anode of the electrolyser, and giving off their electric charge, become chlorine molecules which remain in a gaseous state. The positively charged sodium ions travel to the cathode of the electrolyser, and giving off their electric charge, become sodium molecules which immediately react with the water present, resulting in the formation of sodium hydroxide solution and gaseous hydrogen. If we imagine the electrolyte to be stationary, the solution around the anode will be acidic, and that around the cathode will be alkaline. Because of the gradation set up in the concentration of the catholyte, as the distance increases from the cathode, there will be the diffusion of the alkali. In addition, there will be the electrical migration of OH ions

towards the anode. The interaction of the anodic, acidic zone and the cathodic, alkaline zone will take place somewhere,

R. V. RAMANI*

in between the electrodes, and there will exist a neutral zone. After some time this neutral zone will travel towards the anode, lowering the current efficiency of the electrolyser, and when the neutral zone touches the anode the current efficiency becomes zero. For the successful operation of the electrolyser at peak efficiency, it becomes fundamentally necessary to keep the anolyte and the catholyte away from each other, preventing these undesirable secondary processes. This is the key-note in the design of chlorine-caustic electrolyzers.

DESIGN TYPES

The various designs may be classified thus :

1. Cells in which the OH ions are not liberated inside the electrolysis chamber—that is, all mercury processes.

* Mr. RAMANI is Senior Chemist with MCIC.

2. Cells in which the OH ions are liberated inside the electrolysis chamber (losses due to convection and mechanical mixing, avoided).

- (a) Designs (stationary electrolyte: diaphragm) which reduce diffusion losses to a minimum, but which do not eliminate losses due to OH ion migration.
- (b) Designs (moving electrolyte: no diaphragm) which largely reduce both migration and diffusion losses.
- (c) Designs (moving electrolyte: diaphragm) in which all sources of losses are more or less completely eliminated.

This United States of America which is the leading manufacturer of chlorine and caustic soda employs, for the most part the moving electrolyte filter diaphragm type.

This paper confines itself to a consideration of some aspects of only this type.

Its chief characteristics are:

1. The alkali and hydrogen are formed in the electrolysis chamber.
2. The effects of convection and mass movement of the electrolyte are eliminated by the use of a porous diaphragm between the anode and the cathode.
3. The effects of diffusion and ionic migration, resulting in the loss of yield of the products, are largely counteracted by the flow of the electrolyte, arranged to oppose the diffusion of alkali and

migration of OH ions towards the anode.

COMPONENTS

We shall now consider the various components used in building the cell.

ANODE: For continuous and economical operation and for ensuring a pure product, the anode should not get disintegrated; neither should it get attacked chemically. It should also possess good electrical conductivity. Graphite has these characteristics in a good measure. It conducts electricity well, is resistant to chlorine and disintegrates only slowly in service. It is further improved by impregnation with cobalt salt solutions. Oxygen evolution then takes place through the successive formation and decomposition of a higher oxide of cobalt. With an electrode like graphite it is best to keep the current density high, so that the greater part of the electrolysis will, necessarily, take place on the surface of the electrode. The electrolysis of the dilute solution in the interior of the electrode will thus be largely avoided, resulting in a purer anode gas. The life of graphite anode ranges from 360 to 480 days.

CATHODE: When there is hydrogen evolution in the process, and the catholyte is alkaline, iron is used. The hydrogen over-voltage for iron is also low. At technical current densities (1–10 amps./dm²) and temperatures (30–90 deg. C) the over-voltage varies between 0.3 V and 0.55 V. With iron, Sacerdoti found a decrease of 0.05 to 0.1 V in hydrogen over-voltage, on increasing the

temperature from 24 to 97 deg. C. So, higher temperatures are favourable in the cells. Further iron is a comparatively cheap material, and is easy to fabricate to any shape. The life of the cathodes mainly depends on the care bestowed on operating the unit. With proper care, a cathode will easily last for a minimum of ten years.

DIAPHRAGM: It is the diaphragm which decides the success of the process. A good diaphragm should have good mechanical strength, and be inert to the solution and gases with which it comes into contact, so that renewal costs and stoppages are kept low. It should have a low electrical resistance, and be capable of stopping diffusion and convection. Asbestos, treated with acid, and baked, is used extensively in these cells. Also, asbestos paper and asbestos cloth treated with some suitable powder, are used. A diaphragm consisting of a foundation of closely woven asbestos cloth over which is evenly spread a mixture of BaSO₄ and long, fibred, asbestos wool is also used.

For the diaphragm to work successfully with a good current efficiency, the neutral zone of the electrolyte must be fixed in the diaphragm itself, and be kept stationary. This is achieved by the interposition of the filter diaphragm which, also, makes for compactness, as the anode and the cathode can be kept closer, using high current densities.

If the brine is properly purified, the only possibility for the pores to get choked, is from the disintegrating graphite

anodes. Even this is avoided in vertical and submerged diaphragms. Vertical diaphragms, in addition, afford a more accessible cell construction and can be easily renewed. The cell is, also, more compact for the same power consumption. But, in vertical diaphragms, one side is always in contact with acid solution, whereas in horizontal diaphragms, the solution can be alkaline. As it is easier to prepare diaphragms chemically resistant to alkali than to acid, the horizontal diaphragm has an advantage here. Further, the horizontal diaphragm is uniformly subjected to the same stress, whereas a vertical diaphragm is not.

Finally, the ratio of brine flow to current, must be kept uniform at all points throughout the diaphragm, if a high current efficiency is to be achieved.

The life of the diaphragm varies from 120 days to 360 days, depending upon the material used and operating conditions.

CELL TANK: This is made of C. I. steel or steel and concrete. With a constant current on the cell, any of these materials stands well for a reasonable length of time. Frequent alterations in cell load subject the materials to thermal fluctuations which contribute to its early deterioration. The tank is insulated on the anode side by acid-resisting bricks or linings. The cell covers are either stoneware or reinforced concrete.

Cylindrical type cells are claimed to have the following advantages over those of the rectangular type:

1. Cathode and diaphragm are made of only one circularly bent sheet.

2. The ring of graphite anodes arranged around the inside of the diaphragm permits of a larger utilisation of anode surface per unit of weight of graphite in the cell.

3. For a given weight of material the circular design permits of stronger construction.

4. There being no "ends" to the anode chamber, heavy parts are eliminated.

The cells depend upon the following operating characteristics:—

1. *Effluent Rate*: The rate of flow of electrolyte through the cell is called the Effluent Rate. The velocity head of the effluent arrests the back migration of OH ions and alkali diffusion, and keeps the neutral zone of the electrolyte at the diaphragm. Brine head, temperature of the electrolyte, anode and cathode gas conditions and porosity of the diaphragm control the effluent rate. The cell design must provide adequately for variation of as many of these factors as possible for flexibility in operation and longer diaphragm life.

2. *Temperature*: This is contributed by the heat of electrolysis and the heat of resistance. An increase in temperature lowers solubility of chlorine in brine, but increases its degree of hydrolysis. Hypochlorite concentration is thus influenced in opposite directions. Experimentally, it is found that the fraction of current producing chlorate decreases with decreasing temperature. On the other hand, OH discharge over-voltage

decreases. This facilitates the burning of the anode and contamination of anode gas. To achieve good results, therefore, the temperature must be as low as possible.

3. *Voltage*: The voltage drop across the cell is made up of:

- (1) The decomposition potential of NaCl
- (2) The over-voltage at the electrodes
- (3) The resistance across the electrolyte
- (4) The resistance of the diaphragm and
- (5) The voltage drop in the leads and terminals depending on their material and the efficiency of the electrical contacts.

All these factors are decided by current density and temperature. Item (1) is independent of current density. Item (2) is increased by a higher current density. Items (3) and (4) both vary directly as the current, and are less at higher temperatures. Item 5 will increase with current density, though temperature may have little effect. However, industrial production demands large output and low heating cost—which outweigh these voltage advantages. Further, the graphite loss at higher temperatures, also, has to be considered. So, units are worked at high current density and low temperature. The current densities usually employed are 0.03–1 amp./sq. in. for anodes and 0.21 to 1 amp./sq. in. for cathodes,

For the connecting leads and bus-bars, copper is used, because of its high conductivity. Aluminium is also worth considering. Though the conductivity of aluminium per unit volume is not much more than half of that of copper, yet, on account of its lightness, its conductivity per unit weight exceeds that of copper.

A diaphragm cell works at 90 to 96 per cent current efficiency and 50 to 65 per cent energy efficiency. About 50 to 60 per cent of NaCl fed is electrolysed and the rest is returned to brine section, after evaporation of the cell liquor.

The brine feed to the cell should normally be as under:

NaCl = 300–320 G/L.

Excess NaOH = 5–100 lbs. per 100,000 gals. of brine

Excess Na_2CO_3 = 300–600 lbs. per 100,000 gals. of brine

Na_2SO_4 .. = 15 lbs. or less per 1000 lbs. NaCl.

Ca., Mg., & Fe. = Nil.

Suspended impurities = Nil

Temp. 70–80 deg. C.

The alkali produced at the cell analyses to:

NaOH = 135–140 G/L

Na_2CO_3 = 1–2 ..

NaCl = 135–140 G/L

NaClO_3 = 0.1–0.2 ..

Power consumption varies from 2600–3200 kWh per ton of caustic made.

There are different types of cells in this moving electrolyte-filter diaphragm type electrolyzers, varying in capacity from 1000 to 20,000 amps.

To work the diaphragm type of cells, at minimum voltage, the design should conceive of: (1) Minimum distance between the anode and the cathode (2) A diaphragm of low electrical resistance (3) A device to prevent the graphite dust from settling on the diaphragm (4) Minimum external lead (5) As few electrical contacts as possible and (6) A design of contacts with the least contact resistance.

In addition, the best design calls for: (1) Minimum space requirement per ton of product produced (2) Lower current consumption (3) Easy renewal operations in minimum time (4) Easy accessibility to parts of the cell for quick repairs or renewals (5) Minimum labour requirement for continuous and trouble-free operation (6) High current efficiency and (7) Low electrode consumption.

REFERENCE

The Principles of Applied Electrochemistry — A. J. Almand, M. C., D. Sc., F. I. C., F. R. S.



MCIC Chemists in conference at the zero hour

"For this relief, much thanks"—SHAKESPEARE
(With apologies to his shade)

Place: Chemists' Room, MCIC.

Time: Zero hour. (Usually between 1-50 p.m. and 2-00 p.m.)

Dramatis Personae: Sampath, C. S. Srinivasan, Ramakrishnan and others,

Here our play-writing genius dries up, and so we regretfully resume, in pedestrian prose.

The outgoing and incoming chemists meet at their room every day at 1-30 p.m. for handing over and taking over. After formal exchange of information about official duties, the topics of the day are thrashed out. "News is sacred; comment is free", observed that doyen of journalism, the late Mr. C. P. Scott of the *Manchester Guardian*. Our Chemists are firm believers in this dictum.

Mark their faces. Observe carefully. Don't you see the faint flicker of a

suspicion of a smile hovering about their lips? No? Then, something is wrong with the lens—the photographer's, not yours—or with process engraving.

Sampath is "head and shoulders" above the others, even in squatting position, if you would only shut your eyes to the hard fact of the table which is his seat.

Enacting his role standing 'with his right arm gracefully resting on his waist' is "Doctor" Ramakrishnan.

As the two o'clock siren goes off, the characters make themselves scarce or as the immoral bard would himself have put it—*Exeunt!*



Gobbledygook: A friend recently took us to task for declining to review in the columns of this journal, a religious tract, of which he was author.

Assuming our best diplomatic manner, we pointed out to him that *METKEM* was hardly the magazine for an assessment of the merits of a religious treatise. The friend was not convinced. He countered, "But you did a review of *Plain Words*?"

A storm-avener by instinct, and a dose of veritable "refined" oil for troubled waters, by upbringing, we could not still refrain ourselves from replying. "So what? *Plain Words* is by no manner of means a religious pamphlet... Even the English Civil Servant, for whose especial benefit it was written, does not consider it his Bible!"

The author could not sort this out; there was "rank" confusion, and he left us in high dudgeon.

Which recalls to mind the fine review of Sir Ernest Gowers's new book *An*

ABC of Plain Words (sequel to his best seller *Plain Words*) by an elder British contemporary, the *CHEMICAL AGE*, in a recent number. *An ABC* does not cover new ground, but its manifest advantage over the other is in its alphabetical arrangement of entries.

"It is the duty of the scientist," observes the editor, "to let books of this kind help him, for his function in society cannot be effectively carried out if he is unable to make himself readily understood by plain people as well as by complex colleagues."

Sir Ernest uses the American word "gobbledygook" to describe the prevalent twentieth century "officialness". But although Civil Servants may be prolific offenders, the flabby, pompous style is by no means a monopoly of Whitehall or Washington or New Delhi. "Private enterprise has its own bureaucracies", as the editor of *CHEMICAL AGE* rightly points out, "and their literary output is often stamped with the same die. Scientific writing abounds with it

and more dangerously, because some of the pompous phrases have now become common coinage in papers written by scientists for other scientists."

We would commend *An A B C of Plain Words* particularly to the young scientist who wants to be understood. (Copies are available from the British Information Services, Catholic Centre, Armenian Street, Madras). Before he starts using *An A B C of Plain Words*, as a reference book, he should, however, have read, marked and inwardly digested Professor Reginald O. Kapp's *The Presentation of Technical Information*. (Constable, 1948).

And to renew an offer: METKEM is always there for giving elbow-room to the literary efforts of all aspirants to fame!

We set great store by our "Veepee": This issue is dedicated to the Staff Association. Naturally, therefore, you should get better acquainted with its energetic Vice-President, Mr. Krishnayya, Chief Store-keeper. Of benevolent aspect, Krishnayya can belie it, once in a while.

As for instance, even when the article you have indented for, stares you right in your face, all that you get from Krishnayya is a polite, but firm 'No.' In other words, all that is *in store* for you is only disappointment!

One of the occupational hazards of a Store-keeper is that he has often to adjudicate between the rival claims of departments for stores in scarce supply. Krishnayya has evolved a wonderful system for settling priorities. And it is

simply this. The rival claimants have to "fight it out" between themselves, first,



Mr. Krishnayya

and the successful (wordy-) duellist presents himself, later, before the "arbitrator-without-bias" for receiving the prize.

In all that he does, Krishnayya carries his men with him. As the Staff Association "Veepee", he carries all the members with him. Small wonder, therefore, that there is a strong movement abroad for making Krishnayya the permanent Vice-President of the Staff Association.

Krishnayya is a real "sport". He plays the game, whatever the outcome. He conceived a violent passion for Tennis, in March last, and in April, he was elected its captain. In the Annual Day Tournaments, Krishnayya took part in several field-events, but when it comes to announcing the results of his participation, METKEM is a sealed book!

Leader of the Opposition: You should, also, meet Mr. N. Sundaresan, a former

Vice-President (1948-50) of the Staff Association, and now the "Leader of the Opposition."

Sundaresan is one of our Senior Chemists, and is working, at present, as



K. Sundaresan

Technical Assistant to our Production Superintendent. As one who has worked practically in every section of our factory—what he does not know about it—is not worth knowing. In our Research Laboratories, he has done much creditable work on the stability of bleaching powder, and has contributed greatly to the standard quality of our product.

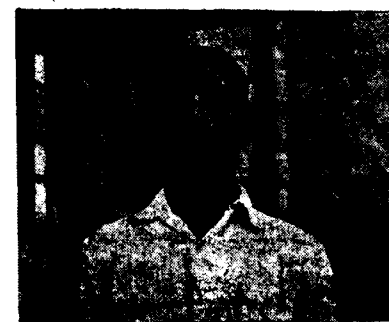
A tennis star of no mean magnitude, Sundaresan annexed the Singles Cup in the Tennis Tournament, held under the auspices of the Mettur Recreation Club, last year. He excels in badminton, too.

Both on the field and off it, Sundaresan is a gentleman to his finger tips. Suave and soft-spoken, Sundaresan can still make his presence audibly felt, at Association Meetings. To recall one classic instance:

it was the Staff Association General Body Meeting. Some one had a brain-wave about a "voluntary" contribution from salaries, for what was indubitably a worthy cause. There was general silence. The President naturally (mis-) took the silence for consent. But when he announced, however, that he took it that the proposition had been passed unanimously, a voice from the back benches stage-whispered, "Almost unanimously, Sir". The owner of that voice was, of course, Sundaresan.

Sundaresan gives a real "tone" to our meetings. Since he put on the mantle of the opposition leader, there has never been a dull moment in our proceedings. Here's wishing, 'More Power to the Voice of the People.'

"See you at the Library": Meet Mr. Khader Khan, Operator, Caustic Smelting Section, but then we will have to take you to our Reading Room and Library, where he usually spends his off-moments.



Khader Khan

Whilst others would be studying intently, the pictures of photo-genic

young women in the illustrated press, Khader Khan would be poring over the pages of the PRABUDDHA BHARATA, a religious periodical, and the MODERN REVIEW, that ancient monthly.

Alert and keen, Khader Khan has a deep concern for his fellow-men and a sincere regard for his foreman.

Square deal for round play: The femme note of this number is supplied by three-year old Shanta, daughter of Mr. A. R. Narayanan, Senior Chemist. Shanta ably assisted the Managing Committee of the Staff Association in the formation of the teams and in the arrangement of the fixtures for the Staff Day Tournaments.

Any normal-witted child can, probably, pick a piece of paper from out of several, but what was remarkable about Shanta's performance was that she picked the pieces, with an uncanny precision, in

twos, fives, and sixes, just as these were required for making up the teams. Midway, the Committee muttered compliments, Shanta paused to execute a slyly graceful, a shyly grateful bow, and resumed her good work.

Judging from the equal chances all the teams had for victory, Shanta deserves full marks for her "extremely" square deal.

As camera-shy as Greta Garbo, Shanta would not pose for a picture. Not all the powers of persuasion of our photographer—and these included (offers of) toffees and chocolates—could avail him. For once, Ramanath really failed to "click"!

Papa Narayanan's face so lit up with joy at the time of the drawing that you would have thought he did the thing himself!

— R. P.

For Quality & Durability

INSIST ON

ELPHINSTONE MILLS FABRICS

**SAREES
DHOTIES**

**COATINGS
POPLINS**

**DRILL
SHEETINGS**

ETC., ETC.,

The Elphinstone Spg. & Wvg. Mills Co. Ltd.

Agents: Messrs. Chidambaram Mulraj Co., Ltd.

KAMANI CHAMBERS — — 32, NICOL ROAD

BALLARD ESTATE, BOMBAY

Telephones: MILL 60451

OFFICE: 3020L & 27773

Telegrams: ELMILCOL

METKEM News

STAFF ASSOCIATION DAY

THE Staff Association Annual Day was celebrated with great *eclat* on January 2, 1952. The function was arranged on the lovely lawns in front of the office buildings. Mr. V. Seshasayee, Managing Director, Seshasayee Bros., Ltd., President of the Association, was in the chair.

Secretary of the Association formally welcomed Mr. Seshasayee, Mr. S. Vaidyanatha Iyer, Chairman, Board of Directors, and other distinguished guests, and presented the Annual Report for 1951.

The Report contained a *resume* of the activities of the Association for the year just ended, and concluded with a renewal of the request of the Members for the provision of a *pucca* Clubhouse.



Mr. S. Vaidyanatha Iyer, Chairman, Board of Directors addresses Members of the Staff Association. On his left is Mr. V. Seshasayee, Managing Director, Seshasayee Bros., Ltd.

The proceedings began with a prayer rendered by S. Sundarraman, Junior Engineer. Tea over, R. V. Ramani, Joint successful competitors. He expressed

satisfaction at the keen interest taken by all categories of staff and workers in the activities of the Association.

As each winner stepped up to the rostrum to receive his prize, there was tremendous cheering, but all this was like the faint sound of a toy-pistol to the boom of a cannon to what N. Venkatachalam, our volley ball captain got! Did you hear us say a cannon? Make it *two*!



Some of the Prize-winners in the Staff Association Annual Tournaments

Venkatachalam received his award for gallant participation in the largest number of events humanly possible—for good play and bad luck!

In a brief speech, Mr. Seshasayee congratulated the Association on its splendid record for 1951. He, also, felicitated the successful participants.

Mr. Seshasayee availed of the occasion of the celebration to speak about the

desirability of the country having a common form of prayer. He said that they should evolve a "standard" form, commanding the largest measure of agreement amongst the followers of at least the major religions.

Touching upon the grave food situation of the country, Mr. Seshasayee said that the need for observing fasts as often as possible could not be over-emphasized,

and that a duty devolved upon all patriotic citizens to take increasingly to the use of non-cereals. Particularly, people in the South, he added, should firmly resolve not to take rice more than once a day.

Referring to the cordial relations that prevailed between labour and management at MCIC, Mr. Seshasayee said that he was proud of this concord. He expressed his belief that such happy

relations would always continue to the lasting benefit of all concerned.

With a vote of thanks proposed by C. S. Srinivasan, Joint Secretary, the pleasant function came to a close.

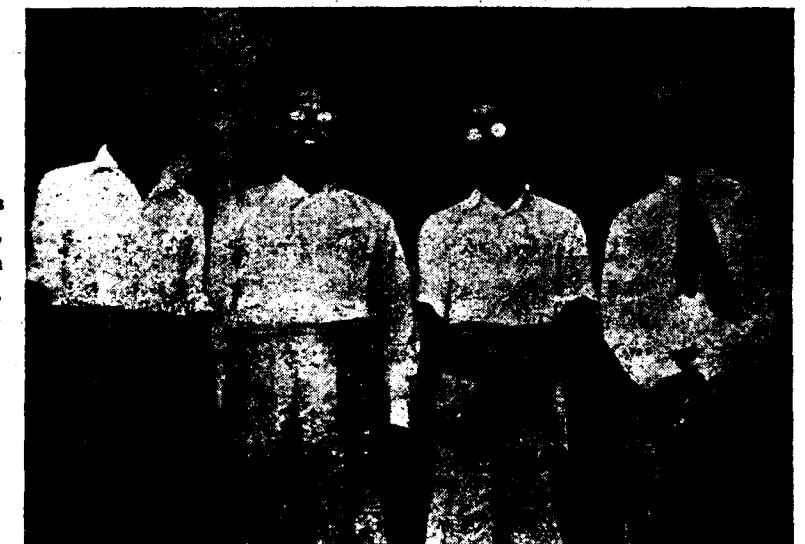
WELCOME VISITORS

Two visitors whom we were happy to welcome and show round, were Mr. McKelvie, United Kingdom Trade Commissioner, and Mr. J. N. Moudgill of the Faculty of Mechanical Engineering, University of Roorkee. Mr. J. N. McKelvie arrived on January 21 and Mr. and Mrs. Moudgill, accompanied by a party of students, on January 26.

Left to Right:— Mr. K. P. Bhat, Divisional Engineer (Operation) Hydro-Electricity Dept., Mettur Dam, Mr. K. Rajagopal, Engineering Supdt., MCIC, Mr. J. N. Moudgill and Mrs. Moudgill



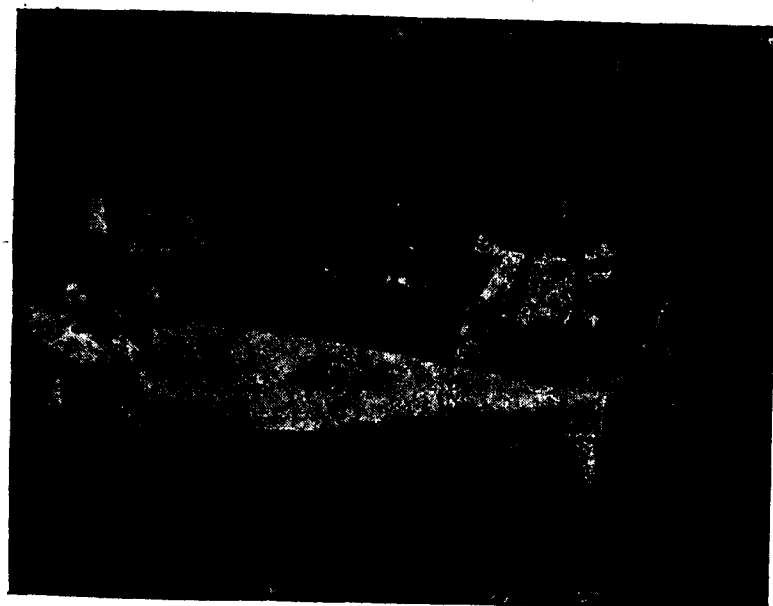
Left to Right: Mr. K. Ramanath, Works Manager, MCIC, Mr. K. P. Bhat, Mr. S. Ramaswamy, Production Supdt., MCIC & Mr. J. N. McKelvie, U. K. Trade Commissioner in New Delhi



SARVODHAYA

Under the joint auspices of the Staff Association and the Mettur Chemicals School, the fourth death anniversary of Mahatma Gandhi — January 30—was observed with due solemnity. Non-stop spinning and recitations from the *Gita* by M. K. Rajagopal marked the ceremony.

of T. V. Krishnamurthy, Bhanumathi, daughter of K. Ramnath, and Santha, niece of V. Ramachandra Rao. R. Natarajan, Secretary, MCIC, read out the essays at the meeting held later day and in the complimented the children on their creditable levels of performance. (The first of these essays—Kamala's—is reproduced in the Tamil section).



"The Post-man always rings twice"—once the real, the second time, the false!
Sethuraman, Clerk, MCIC, successfully impersonated a post-man at our Fancy Dress Competition.

K. Rajagopal is a keen philatelist, but, probably, can't tell a pseudo post-man when he sees one!

A feature of the function, this year, was the essay competition arranged for school children. The subject was "Gandhiji's Life and Teachings." Having in view the classes to which the children belonged, three prizes were awarded. The prize-winners were, Kamala, daughter

T. K. Sitaraman then rendered some of the lyrics of Namakkal Ramalingam Pillai, the Tamil Poet Laureate of the Madras State. With the singing of *Ram Dhun* the meeting drew to a close.



"No substitute for wool": "There is no substitute for wool", say the advertisements of the International Wool Secretariat, but to the slight discomfiture of wool growers, a substitute has been evolved.

The substitute is called Ardil, a protein fibre made from groundnuts, in the new I. C. I. plant in Dumfries, Scotland. It is claimed that Ardil has most of the properties of wool, *plus* some important properties that wool does not possess, and minus only one or two properties that wool does possess. According to an article in *FUTURE*, the British Magazine for Business Men, "the process consists of dissolving protein out of the groundnut meal (or cattle-food) with dilute alkali (caustic soda) and of filtering off the solution. What remains goes back to livestock as fodder. The protein solution is then acidified and the soluble impurities are filtered off. This purified spinning solution is then pumped at a uniform rate through a spinneret or disc containing from 1000 to 5000 holes of about 0.1mm diameter into an acid bath. This acid precipitates the protein as a bunch of fibres which must next be washed and hardened by tanning with formaldehyde. But, of course, the difficulty is to do just

these things—to convert a liquid into solid fibres, able to withstand a reasonable strain and capable of stretching. It is this part of the process which constitutes the know-how that is ICI's secret. It has cost them plenty to discover it. To certain parts of the Dumfries factory, visitors will have no access for an indefinite period."

Riding on Resin-Glass: A new use for plastic has recently been reported by Dynakon Corporation, a Cleveland Plastics firm. It substitutes steel tie-plates on railroad tracks. The plates are made of an Eberglas-polyster resin laminate. The material has many advantages in that its weight is only one fifth of that of steel, and because of its resiliency, lasts longer and protects the ties from being cut by the rails. Unlike steel, it is unaffected by brine solution dripping on the tracks from refrigerated cars. But there is, however, this danger, in that the plates can crack, during installation, if a sledge-hammer hits the plate instead of the mounting spike.

Uranium in Rajasthan: Replying recently to questions in Parliament (a) whether uranium had been discovered by the Directorate of Mines in Rajasthan and if so, whether the samples had been analysed and (b) what were the minerals that were likely to be discovered, the Minister of Natural Resources and Scientific Research said that the answer to question (a) was in the negative and that the answer to (b) was that it was not possible to say what minerals, apart from those already known, were likely to

Intensive research in various fields of science is being conducted by the Council

Calcium Carbide Factory : A factory for the manufacture of calcium carbide has been started at Talayuthu in the Tinnevely District of Madras State. Pure lime which is the main raw material for its manufacture is available in large quantities in the neighbourhood. The new factory is expected to turn out 70 tons of calcium carbide every month. India's annual requirement of calcium carbide, estimated at about 10,000 tons, is imported mainly from Canada, Africa and Norway.

Mettur Chemicals: 196—Murugayya 60,
K. Ganesh 32, K. R. V. Raman 25,
T. D. K. Swami 20, N. S. Narayanan
3 for 48, Vijayaraghavan 3 for 7, C. S.
Gopalan 2 for 25.

Salem Cricket Club: 202 (Rajaramalingam 52, S. Balakrishnan 44, Shankar 20, Murugayya 3 for 51, Jayaraman 2 for 39; K.R.V. Raman 2 for 16, Raghavan 2 for 35)

Y20570211, 0168MM
NS2.6.1



4

(1) Pole-Vault: P. Chockalingam in action.

(2) Sack Race: The winner was K. Ratnam, second from right in "Sack clothes".

(3) N. Venkatachalam, the "all-play-but-no-luck" Jack! We awarded him a special prize. See story in "Metkem News"

(4) Slow cycle race in progress.

(5) High jump: R. Krishnamurthi, the winner, in action.

(6) Tug-of-war: MCIC Watch and Ward Team pulling their weight against the Mettur Recreation Club in the Republic Day Tournament. Our men were runners-up.



6



27

On January 26—Republic Day—we met the Mettur Recreation Club in a festival match. The match was played on "enemy" grounds, and drawn.

Mettur Recreation Club in 96 (R. Krishnamurthi 33, Srisailam 23, R. G. Raghavan 5 for 26, N. Jayaraman 3 for 23, Raju 2 for 27).

Mettur Chemicals: 76 for 6 (K. Sampath 18 N. O. K. S. S. Mani 17, C. S. Gopal 3 for 7, Narayanan 2 for 11).

Staff Association Annual Day Tournaments: The Staff Association announced

A Committee, consisting of T. D. Krishnaswami, P. B. Srirangan and R. G. Raghavan, was constituted to conduct the tournaments. With the willing and wholehearted co-operation of the other members, the Committee discharged a tiresome, but pleasant (*sic!*) task, most ably indeed. All the events attracted quite a good crowd, and if only stentorian cheering of supporters could win events, there should have been no losers!

A feature of this year's balloting was the provision made for prize awards to



Mixed Doubles (Badminton): Participants in the Tournament conducted by the Mettur Recreation Club in connection with Republic Day

the programme of its various tournaments and field events as early as November 51 for its Annual day which, as reported elsewhere, came off on January 2. The events were open to all the employees of MCIC and allied institutions. A record number of entries was received this year.

winners in the qualifying rounds of Tennis and Badminton Doubles.

Tennikoit: This popular game attracted as many as 16 entries in Doubles. It cannot truthfully be said that the standard displayed in the matches

touched new levels, but every round was fought out keenly. The fancied pair (R. Srinivasan and T. P. Ramaswami) won the finals—being a definitely better side. (Otherwise, we wouldn't have put our shirts on them). Nevertheless, it has to be admitted that the runners-up (R. G. Raghavan and C. S. Srinivasan) gave them plucky battle. R. Natarajan (Junior Engineer, not to be confused with his lay namesake) and T. V. Krishnamurthi won the qualifying round.

Badminton: The Doubles event attracted 14 entries in all. Some of the matches played in the top half were really "tops", but the finals (P. B. Srinangan and K. Sampath vs. K. Ganesh and S. P. Iyer) looked rather tame, in comparison. The match ended in two straight games, the winning pair proving just too good for their opponents' liking.

T.D.K. Swami and G. Arokiasamy won the qualifying round. There were 7 entries for the Fives. All the matches were most interesting. In the finals, R. K. Murthy's Team beat K. Ratnam's Team easily in two games.

Volley Ball: There were seven entries for the Sixes. The finals were keenly contested, and the winners (R. G. Raghavan's Team) were forced to concede a game to N. Subramanian's Team before they annexed the deciding two games.

There were five entries for the Trebles. The finals drew a very big crowd, and

the match was closely fought, excitement running very high. The consensus of opinion was that the balance was slightly tilted in favour of the winners (N. Venkataraman's Team) by the inclusion of your humble scribe, in their side. (When it comes to making a volley ball triumvirate, it is Caesar or nothing, with our correspondent—*Ed.*)

K. Sampath's Team were the runners-up—naturally.

Caroms (Doubles): Eight entries were received. As usual, the veterans played their superb game, but what usually decided the issue, or—should we say—dished their fate, was the support or—lack of it—they had from their partners. S. Sambandam and P. B. Gopalan beat K. K. Dharmarajan and D. Rathinam very easily in the finals. (*Quiz:* Did K. K. Dharmarajan (Our Chief Accountant) count the coins as his opponents pocketed them? *Ed.*)

Chess: This king of (indoor) sports and sport of (indoor!) kings does not, alas, have much of a following, at Mettur Dam. 'Give us always the wide, open spaces', we say. On ordinary days, (usually, wet) of course, we used to arrange ourselves into two parties and play out the game for the two principals. But a match is something sacrosanct—even with us. Or, perhaps because we couldn't help ourselves, we stayed out. In any case, we avoided the matches like the pl—er—like the good players that we were. We turned up, however, in strength, on the day of the finals, in time,

to witness T. K. Sitaraman's triumph over P. R. Subramanian. At least, we were there to offer our congrats. to Sitaraman as he emerged victor!

All the matches, it would appear, evoked considerable interest, and some of the points of dispute that arose in the course of play were so delicate that expert opinion had, often, to be obtained. More than once—to be precise—twice, the authoritative aid of Mr. T. A. Krishnamachari, the celebrated chess columnist of the HINDU was invoked.

Auction Bridge: There were eleven entries. All the matches were fairly well-attended. K. K. Dharmarajan and S. P. Iyer beat T. V. Krishnamurthi and V. Muthusami in the finals. The winners fully deserved their success. That they had a bigger quota of aces and kings and queens than their opponents was simply co-incidental!

Literature: In all, there were ten entries. Spectators so swarmed the halls that the players had practically to contend with them for sitting space. R. Krishnamurthi and partners beat C. S. Srinivasan and partners in the finals. Quite an exciting affair, the finals, the result hanging in the balance until the last minute.

Tennis Doubles: Four entries were received, but the tournament has not been played so far. As many different views as there were players were aired about the grouping, the drawing of the lots, the kind of tournament to be staged, etc. etc. The rumour that Dr. Frank Graham, the Kashmir U. N. Mediator, has been invited to arbitrate, is absolutely baseless.

Field Events: We had a bumper crop of entries and enthusiastic crowds, always turned up at all the events. In fact, to revise the poet: 'Those who came to laugh, remained to play'...themselves.

— T. S. S.

PRIZE WINNERS

<i>Games</i>	<i>Winners</i>	<i>Runners-up</i>
Volley ball (Sixes)	R. G. Raghavan K. Ratnam P. Chockalingam D. Rajan D. Rathinam A. Parameswaran	N. Subramanian R. K. Murthy T. S. Subba Rao C. S. Ramasamy D. Sethuraman K. S. S. Mani
Trebles:	N. Venkataraman K. Rathinam T. S. Subba Rao	K. Sampath R. K. Murthi P. R. Subramanian

<i>Games</i>	<i>Winners</i>	<i>Runners-up</i>
Badminton (Fives)	R. K. Murthi C. S. Ramasamy P. B. Srirangan C. S. Srinivasan N. Kalyanam	K. Ratnam N. Sundaresan S. K. Chakrapani S. Ramaswamy K. Rajagopal
(Doubles)	K. Sampath P. B. Srirangan	S. P. Iyer K. Ganesh
Qualifying round	T. D. K. Swami G. Arokiasamy	
Tennikoit (Doubles)	R. Srinivasan T. P. Ramasamy	R. G. Raghavan C. S. Srinivasan
Qualifying round	R. Natarajan T. V. Krishnamurthi	
Caroms (Doubles)	S. Sambandam P. B. Gopalan	K. K. Dharmarajan D. Ratnam
Chess	T. K. Sitaraman	P. R. Subramaniam
Auction Bridge	K. K. Dharmarajan S. P. Iyer	T. V. Krishnamurthi V. Muthusami
Literature	R. K. Murthi V. Subramanian R. S. Subramanian	C. S. Srinivasan P. B. Srirangan N. Krishnayya

<i>Field Events</i>	<i>I</i>	<i>II</i>	<i>Record</i>
Long Jump	K. A. Palaniappan D. Sethuraman	M. S. Dorairaj	15' 6"
High Jump	R. K. Murthi	Rajamanickam	4' 8"
Hop-step and Jump	K. A. Palaniappan	T. Antony	32' 10½"
Pole-Vault	P. Chockalingam	Rajamanickam	7' 5"
Shotput	T. A. Javanthinathan	A. V. Thomas	32' 2"
Cricket ball throw	A. S. Devarajan	T. V. Krishnamurthi	202' 2½"
Slow cycle race	R. Dorairaj	K. Sampath	

<i>Field Events</i>	<i>I</i>	<i>II</i>
Sack race	K. Ratnam	K. Makesan
Three-legged race	K. A. Palaniappan & S. Venkataraman	T. Antony & R. V. Ramani
Cricket :	Best batsman of the season—N. Kalyanam Best Bowler T. D. K. Sami	
Consolation Prize :	N. Venkatachalam	
Tennikoit (Doubles for picker boys.)	Kali Rathinam	Sadasivam Raju

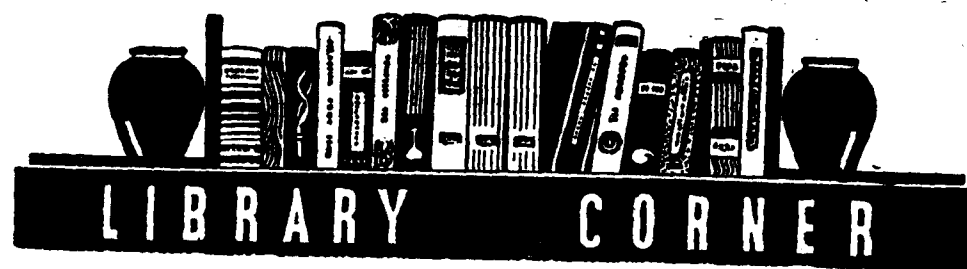
SESHASAYEE INSTITUTE OF TECHNOLOGY TIRUCHI

Readers of *METREM* and friends and customers of our company will be glad to know that classes of this Institute are now in full session. Dewan Bahadur S. Raghava Ayyangar, Chairman, Board of Directors, South Madras Electric Supply Corporation, Limited, formally declared the Institute open on January 28. Speaking on the occasion, Sri Raghava Ayyangar paid a glowing tribute to the signal services of Mr. V. Seshasayee for Indian industry. 'Students of this Institute', he said, 'had the shining example of Mr. Seshasayee before them for hard work and service to the nation, and they should, therefore, lay down traditions which would in every way be worthy of an institution bearing his name.'

Instruction is at present offered at the Institute for a few courses leading up to the A. M. I. E. diploma of the Institution of Engineers (India).

There are 37 students now.

The next session of the Institute will commence early in June.



PRODUCTION PLANNING AND CONTROL: By Thomas H. Landy—McGraw-Hill Book Company, Inc. New York—Price Rs. 33/.

ANY industry that is engaged in commercial production cannot hope to prosper without Production Planning and Control. What is "Production Planning and Control"? One authority terms it "Organized foresight *plus* corrective hindsight". According to another, it is "before-the fact planning and after-the-fact scorekeeping." This definition is slightly more helpful than the first one, although nearly not so helpful as the author's own. Which is, "a scheme of co-ordinated industrial management that starts with the receipt of the order to the final billing of the customer."

The author presents all his information in three major parts.

Part one deals with the importance of production control, the need for its whole-hearted support by management and the benefits that accrue from production control. This part, also, discusses the several ways of installing production planning and control.

The most neglected phase of modern industrial management, according to the

author, is organisation planning. He cannot understand why executives—while they approve of the latest in equipment, methods, etc.,—do not pay much attention to organisation planning.

The alibi usually trotted out is that, in a democracy, people do not wish to be tied down to a set of rules, and that they enjoy fluid management. The author, however, considers this explanation unsatisfactory. The first question, he reminds the reader, that any normal person asks is "What is my job and where does my authority extend?"

He is, therefore, of the view that a job should be defined and after the proper person has been installed on it, proper authority must be assigned, commensurate with the responsibility. "Responsibility without authority is futile", he remarks in this context. "Responsibility without authority is a house without foundation", he observes, earlier in the book.

The fundamental principles governing production planning and control are enunciated in part two.

The third part is devoted to a discussion of "Supplementary Functions and Cases." The ever-increasing competition

in business, the author points out, makes it necessary to manufacture quality products at the lowest possible cost. The approach to these goals, according to him, would appear to be only through efficient preplanning. He defines preplanning or (preliminary or preproduction planning) "as the detailed step-by-step procedure followed in developing, designing and tooling; in developing and installing proper layout with machine tools; in providing proper vendors and in procuring and training operators."

Cases are included in this part to suggest to the reader additional applications of production planning and control, as a whole, or in one of its several phases.

So much for the matter of *Production Planning and Control*; now for its manner. In going through the book, the reader must be thoroughly familiar with what may be called the "American way" of expression; otherwise, it will mean rather heavy going.

The value of the book is greatly enhanced by the inclusion of a number of charts and diagrams.

—N. SUNDARESAN

PROGRESS OF SCIENCE: The Publications **SQUARE DEAL FOR LABOUR:** Division, Ministry of Information and Broadcasting, Government of India, New Delhi.

The title is slightly misleading for, on going through the pamphlet, the reader is disappointed to find that there is precious little in it, either about "Science" or "Progress". What the pamphlet does is to trace the genesis of the Council

of Scientific and Industrial Research Institute and the various National Laboratories and describe the activities of these bodies.

Considering the restricted terms of reference of the booklet, a commendable task is done; information is presented both clearly and concisely. A particularly fascinating chapter is the one entitled "Research bears fruit." This gives a *resumé* of the solutions to industrial and other problems worked out at the National Laboratories. —R. V.

Labour in India is now in a better bargaining position than ever before in the past. With the growth of Trade Unionism in the country and with Government's labour policy for ensuring for the working class, improved conditions of work, minimum living wages and a fair standard of living, the lot of labour has vastly improved. The year 1947, according to this booklet, marked the beginning of an active and positive labour policy—a policy pursued in the words of the Minister for Labour, to enable the worker of India "to enjoy the fruits of his labour and a fair standard of living."

Independence might have meant a square deal for labour, but to say, as the booklet does, that the worker "is no longer left to the mercy of the employer" is to conjure up a ridiculous picture of a heartless butcher and a bleating lamb! Even before the advent of independence, there were enlightened employers in this country. —P. P. V. S.



வேலைக்கேற்ற குணங்கள் தொழிற்சாலையில்*

ஆர். பார்த்தசாரதி

தாராளமாக ஏதாவது ஒரு பொருள் உற்பத்தி செய்யப்படும் ஸ்தாபனத்தை நாம் தொழிற்சாலை என்கிறோம். பட்டு, துணி, முதலியவை, ரஸாயனப் பொருள்கள், மோட்டார், ரயில், சைகிள் போன்ற வாகன சாதனங்கள், நாகரிக வாழ்விற்குரியமையாததெனக் கருதப்படும் சோப்பு போன்ற வாசனை திரவியம்—இவை போன்ற ஏனைய பொருள்கள், உற்பத்தி செய்யப்படும் ஸ்தலங்களை நாம் தொழிற்சாலைகள் என்கிறோம்.

இயந்திர சாதனங்கள் ஒரு நவீனத் தொழிற்சாலைக்கு அவசியந்தான். ஆயினும் அந்த இயந்திரங்களைப் படைத்து, ஆட்டி வைக்கும் மேதை மனிதனே ஆவன்.

இயந்திர மயமாகிய ஒரு நாகரிகத்திலுங்கூட மனிதனின் முக்யத்துவம் இருக்கத்தான் செய்யும். ஆகையினாலே, ஒரு தொழிற்சாலை எவ்வளவு நவீன இயந்திர சாதனங்களைக் கொண்டதாயினும், சிப்பந்தி-நிர்வாகி

உறவு, பொதுஜன தொடர்பு முதலியவை நன்றியுரையிடின் அத் தொழில் நானடையில் கெட்டுவிடும்.

எத் தொழிற்சாலையிலும் பொதுவாக மூன்றுவித உத்தியோகஸ்தர் இருப்பர். முதலாவதாக தொழிலை நடத்தும் பிரதம நிர்வாகஸ்தர்கள். இவர்கள்தான் மாணேஜிங் டைரக்டர்கள், டைரக்டர்கள் போன்றவர். இரண்டாவதாக நிர்வாகப் பொறுப்பில் துணையாக நிற்கும் அதிகாரிகள்—மாணேஜர், இஞ்சினியர் போன்றவர். மூன்றாவதாக சிப்பந்திகள். இவர்கள்தான் வேலையாட்கள், தொழிலாளிகள், குமாஸ்தாக்கள் போன்றவர். படிப்படியாக வரும் இம் மூன்றுவித உத்தியோகஸ்தரின்றி ஒரு தொழிற்சாலையை நடத்துவது எளிதன்று. ஒவ்வொரு தரப்பட்டவருக்கும் சில சில குணங்கள் வகுக்கப்பட்டிருக்கின்றன.

பிரதம நிர்வாகஸ்தர்களுக்கு மூலதனத் தைவிட சிறப்பாக தேவையானது உன்னத

லக்ஷியம். எக்காலத்திலும் அவர்கள் சத்தியம், பிறழ்தல் கூடாது. ஒரு பெரிய தொழிலில் எண்ணற்ற ஏழை மக்கள் பங்குகள் வாங்கியிருப்பர். அவர்கள் ஆயுள் பரியந்தம் சேமித்து வைத்திருந்த பணத்தை ஒரு கம் பெனியின் பங்குகளில் போட்டிருப்பர். நிர்வாகஸ்தர்கள் தங்களை முக்கியமாக எளிய பங்குதாரர்களின் கார்யகர்த்தாக்கள் என்று கருதுதல் அவர்கள் முதற்கடமையாகும்.

கம்பெனியின் பணத்தை கண்டபடி குறைபாடுதல் கூடாது. பங்குதாரர்கள் போட்ட பணத்திற்கு கிரமமான லாபம் கிடைக்கும் வழியில் அவர்கள் தொழிலைப் பொறுப்புடன் நடத்தவேண்டும்.

தொழிலை நடத்தும் நிர்வாகஸ்தர்களுக்கு தங்கள் தொழிலைப்பற்றிய விஞ்ஞான அறிவு ஒரு சிறிதளவாவது இருத்தல்மேல், நிர்வாகத் திறமை மட்டும் போதாது.

சிறப்பாக நிர்வாகஸ்தர்களுக்கு இருக்க வேண்டிய அடிப்படையான குணங்கள், ஆதர்சம், நியாயம், சத்தியம், பெருந்தன்மை, தாராள மனப்பான்மை, குறைந்தபட்சம், குறுகிய மனப்பான்மை யின்மை.

அடுத்தபடியாக அதிகாரிகளை எடுத்துக் கொள்ளுவோம். இவர்கள் தங்களுக்கு மேலே யிருக்கும் டைரக்டர் போன்றவர்களுக்கும், தங்களுக்குக் கீழே வேலை பார்க்கும் சிப்பந்திகளுக்கும் ஓர் இணைப்புட்டு. இவர்கள்தான் ஓர் கம்பெனியின் ஜீவநாடிகள். எப்பொழுதும் இவர்கள் சிப்பந்திகளுடன் நல்லுறவு வைத்திருக்கவேண்டும். இவர்களுக்கு தங்களுடைய வேலைக்கேற்ற அறிவு அத்தியாவசியம். சிப்பந்திகளை சிநேக பாவத்துடன் நடத்தவேண்டும். அவர்கள் கேவலம் வேலையாட்கள், நாம் இடம்கட்டினார்களேச் செய்யக் கடமைப்பட்டவர்கள் என்ற மனப்பான்மை ஒருபொழுதும் கூடாது. சிப்பந்திகளும் நம்மைப்போன்றவர், அவர்

களுக்கும் சக துக்கங்கள் உண்டு. அவர்களும் மனித சமுதாயத்தைச் சார்ந்தவர், அவர்கள் மெஷின்கள் அல்லர், என்பதை அதிகாரிகள் தமக்கு தாமே அடிக்கடி அறிவுறுத்திக் கொள்ளுதல் அவசியம். சிப்பந்திகளின் குறைபாடுகளை பொறுமையுடன் கேட்டு, நியாயமாக இருந்தால், கூடியவரையில், தீர்ப்பதற்கு முயல்வேண்டும்.

மூன்றாவதாக சிப்பந்திகளுக்கும் சில பொறுப்புக்கள் உண்டு. எப்பொழுதும் அவர்கள் தங்களுக்குக் அளிக்கப்பட்டிருக்கும் வேலையை கவனத்துடனும் சிரத்தையுடனும், செய்தல்வேண்டும். எவ்வளவுக்கெவ்வளவு அவர்கள் தங்கள் தொழிலில் ஊக்கம் காட்டுகிறார்களோ, அவ்வளவுக்களவு அந்தத் தொழில் அபிவிருத்தியடையும்; அவர்களும் விருத்தி அடைவர்.

எப்பொழுது பார்த்தாலும் சம்பளத்தைப் பற்றியும், பஞ்சப்படியைப் பற்றியும், நினைத்துக்கொண்டே யிருத்தல் தவறு. நம் நாடு ஒரு ஏழை நாடு என்பதை நினைவூட்டிக் கொண்டு அவர்கள் தங்களைக் கேட்டுக் கொள்ளவேண்டிய இரண்டு முக்கிய கேள்விகள்:

(1) இந்த தொழிலுக்கு தங்களுக்கு கிடைப்பதைவிட அதிகமாக ஊதியம் அளிக்கும் சக்தி உண்டா?

(2) தொழிலின் சொந்தக்காரர்களாகிய பங்குதாரர்களுக்கு ஒரு சிறிதேனும் லாபம் வேண்டாமா?

சிப்பந்திகள் ஒருபோதும் ஒழுங்குமாக நடந்துகொள்ளுதல் கூடாது. ஒழுங்கு, அவர்கள் கடைப்பிடிக்கவேண்டிய லட்சியங்களில் முதல் இடம் பெறவேண்டும். மேலதிகாரி யிடத்திலும், முக்கியமாக அவர்களுக்கு உடனே அடுத்தபடியாக இருக்கும் போர்மென் போன்றவர்களிடத்திலும் அவர்கள் மரியாதையாக நடந்துகொள்ளவேண்டும்.

சிப்பந்திகள், அவர்களுடைய நலனுக் கென்று வருக்கப்பட்டிருக்கிற எல்லா ஜாக் கிரதை முறைகளையும் கையாளுதல் வேண்டும். விபத்துக்களெல்லாம் அநேகமாக அலட்சிய சபாவத்தினாலேயே உண்டாவன. சிறிது முன்னோக்கிரதையாக யிருந்தால் இவைகளைத் தவிர்க்கலாம்.

ஒரு தொழிலில் பட்டறையில் நேராக வேலை பார்க்கும் சிப்பந்திகளைத் தவிர அத்துடன் தொடர்புகொண்ட காரியாலயத்திலும் சிப்பந்திகளிருப்பார்கள். இவர்கள் பின்பற்ற வேண்டிய குணங்களும் சில உண்டு. ஒருமாதிரித் தொழிற்சாலையை நடத்தும் எந்த நிர்வாகஸ்தருக்கும் அந்த ரங்க காரியதரிசி என்ற ஒரு உத்தியோகஸ்தர் இருப்பார். மேல் நாடுகளில் இந்தப் பொறுப்பை வகிப்பவர் அநேகமாக ஸ்திரீகளே. காரியதரிசி நடந்து கொள்ளும் விதத்திலிருந்து ஒரு தொழில் திறம்பட நடத்தப்படுகிறதா, இல்லையா என்று கூட சொல்லிவிடலாம். இவர்கள், காரியாலயத் திற்கு தங்களுடைய நிர்வாகஸ்தர்களைப் பார்க்க வருபவர்களை அனுசரிக்கவாக வர வேற்று, அன்புடன் பேசித் தக்க தருணம் பார்த்து, நிர்வாகஸ்தரிடம் அனுப்பவேண்டும். இவர்கள் டெலிபோனில் பேசும் பொழுது மரியாதையாகவும் இனிமையாகவும் பேசவேண்டும். முன்பின் அறியாத ஒருவர் ஒரு கம்பெனியைப்பற்றி நல்ல அபிப்பிராயமோ, கெட்ட அபிப்பிராயமோ கொள்வது அக்கம்பெனியின் சிப்பந்திகளின் டெலிபோன் சம்பாஷணையையே அநேகமாக பொறுத்திருக்கிறது என்றுகூட சொல்லி விடலாம்.

இதைப் போலவே இன்னும் குமாஸ்தாக்கள் போன்ற உத்தியோகஸ்தர்களுக்கும் சில பிரத்தியேக குணங்கள் உண்டு. இவர்கள் கம்பெனியின் சார்பில் இதரர்களுக்கு எழுதும் கடிதங்களில் தெளிவும், மரியாதையும் தொனிக்கவேண்டும். கூடியவரையில் சுருக்கமானதாகவும் இருத்தல்வேண்டும்.

நான் ஆரம்பத்தில் பொதுஜன தொடர்பு என்ற ஒரு சொற்றொடரை உபயோகித்தேன். இது ஒரு கம்பெனி பங்குதாரர்கள், சிப்பந்திகள், வாடிக்கைகாரர்கள், முதலியவர்களுடன் வைத்துக்கொள்ளும் நல்லுறவைக் குறிக்கும். வெறும் விளம்பரத்தினால் மக்களை ஏமாற்ற முடியாது. "எல்லோரையும் சிறிது காலம் ஏமாற்றலாம், சிலரை எல்லாக் காலமும் ஏமாற்றலாம், எல்லோரையும் எல்லா காலமும் ஏமாற்ற முடியாது"—என்று ஒரு அமெரிக்க ஜூதி பதி கூறினார்.

முக்தியமாக, உற்பத்தி செய்யப்படுகும் பண்டம் நல்லதரமுள்ளதாக இருக்கவேண்டும். "யானிலை குதிரை விலை," யாபு மிருத்தல் கூடாது.

ஒரு கம்பெனியின் பொதுஜன உறவு நன்றாக இருக்கிறதா இல்லையா என்று கம்பெனியை விஜயம் செய்பவர்களுக்கு அது அளிக்கும் வசதிகளிலிருந்து கண்டு கொள்ளலாம்.

சிலர் சொல்லிக்கொண்டு வருவார், சிலர் சொல்லிக்கொள்ளாமலே வருவார். சிலர் ஒருவர், இருவராக வருவார். சிலர் மந்தை மந்தையாக வருவார், சிலர் பணக் காரர்களாகவும், பிரபுக்களாகவும் இருப்பார். சிலர் சாதாரண மனிதர்களாகவும் இருப்பார். எவராயினும் சரி, அவர்களைப் புன்முறுவலுடன் வரவேற்று உபசரித்தல் வேண்டும். "முகந்திரிந்துகோக்கக் குழையும் விருந்து" என்று தமிழ் மறை கூறுகிறது.

தொழிலுக்கு தகுந்தாற்போல் பற்பல தொழில்களில் பலரகப்பட்ட உத்தியோகஸ்தர்களிருந்தாலும் சாதாரணமாக தொழிற்சாலைகளில் நான் குறிப்பிட்டபடியே உத்தியோகஸ்தர்களிருப்பார்கள். எப்பதவியை வகிப்பவராயினும் சரி, எல்லோரும் கடைப்பிடிக்கவேண்டிய குணங்கள் முக்தியமாக இரண்டு. ஒன்று பொறுப்பு உணர்ச்சி; மற்றொன்று பிறரிடம் அன்பாகவிருத்தல்.



கே. கமலா : ஸ்ரீ. T. V. கிருஷ்ணமூர்த்தி (அகௌண்டன்ட்ஸ் ஸெக்ஷன்) அவர்கள் குமாரத்தி வியாசப் போட்டியில் முதல் பரிசு பெற்ற குழந்தை

மகாத்மா காந்தியின் வாழ்க்கையும் போதனைகளும்

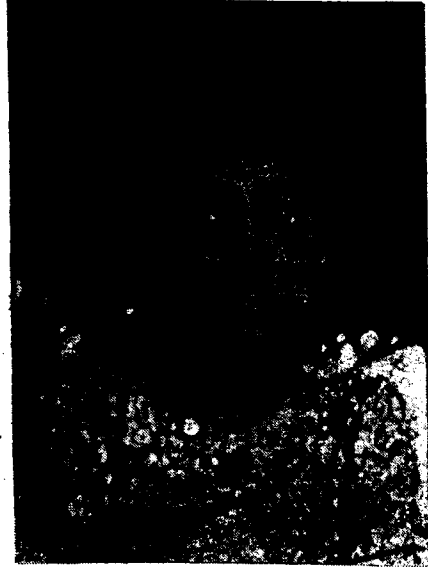
K. கமலா

உலகம் போற்றும் உத்தமரும், நமது தேசப் பிதாவும் ஆகிய மகாத்மா காந்தி கத்தியவாரில் போர்பந்தர் என்னும் ஊரில் 1869-ம் வருடம் அக்டோபர் 2-ம் தேதி பிறந்தார். தந்தையார் பெயர் காபா காந்தி, தாயார் பெயர் புத்லி பாய். காந்திஜி பெற்றோர்கள் மிக நல்லொழுக்கமும், கடவுள் பத்தியும் உள்ளவர். ஆகவே அவர்களுக்குப் புதல்வராய்ப் பிறந்த காந்திஜி இத்தகைய நற்குணங்களைப் பெற்றிருந்தார். தந்தையார் வேலைபார்த்துவந்த இராஜக்கோட்டையில் கல்வி பயின்றார். அவ்வமயம் "சிரவணன் பித்ரு பக்தி" நாடகமும், "அரிச்சந்திரன்" நாடகமும் இவர் மனதைக் கவர்ந்தன. ஆதலால் எப்பொழுதும் தாய் தந்தையருக்குத் தொண்டு செய்யவேண்டும் என்பதும், எக்காலத்திலும் உண்மையே பேசவேண்டும் என்பதும் இவர் மனதில் ஆழமாகப் பதிந்தன. இவரது 13-ம் வயதில் இவருக்கும் கஸ்தூரிபாய்க்கும்திருமணம் நடைபெற்றது.

இவர் பள்ளியில் படிக்கும்போது ஒரு திய நண்பன் சிநேகத்தால் புகைபிடிக்கவும், மாமிசம் உண்ணவும், திருடவும் செய்தார். இவை தவறு என்று தெரிந்ததும் உடனே தன் தந்தையாரிடம் கூறி மன்னிப்புக் கேட்டுக்கொண்டார். அத்துடன் கெட்ட சிநேகத்தை விட்டார். அதோடு கெட்ட பழக்கங்களையும் விட்டுவிட்டார். இவருக்கு தாம் செய்தது தவறு என்று உணர்ந்து கொள்ளும் குணம் உண்டு. இவரது உயர் தர பாடசாலைப் படிப்பு முடிந்ததும், பாரிஸ்டர் படிப்புக்காக இங்கிலாந்து சென்றார். போகும்போது மாமிசம் உண்பதில்லை, மது பானம் செய்வதில்லை, மாதர் இன்பம் வைத்துக் கொள்வதில்லை என்று தாயாரிடம் சத்தியம் செய்து கொடுத்தார். அதன் படியே நடந்து பாரிஸ்டர் படிப்பு முடிந்ததும் இந்தியா மீண்டார்.

இங்கு வக்கீல் தொழிலில் வருவாய் குறைந்து இருந்தமையால், தென் ஆபிரிக்கா

வில் வியாபாரம் செய்து வந்த தாதா அப்
துல்லா கம்பெனியாரின் வழக்கை வாதிக்க
தென் ஆப்ரிக்கா சென்றார். அங்கு இரு
திறத்தாருக்கும் சமரசம் செய்து வைத்து,
இந்தியர்களின் நன்மதிப்பைப் பெற்றார்.
அங்கு குடியேறி இருந்த இலகூக்கணக்
கான இந்தியர்களை தென் ஆப்ரிக்க அரசாங்
கத்தார் மிக இழிவாக நடத்தினர். ஆகவே
இந்தியர்களின் வேண்டுகோள்படி தம்
குடும்பத்தை அழைத்துச் சென்று அங்கு
20 வருடங்களுக்கு மேல் தங்கி, இந்தியர்
களின் உரிமைக்காகப் போராடினார். அங்கு
வெள்ளைக்காரர்களால் காந்திஜிக்கு பல
அவமானங்களும் உயிருக்கே ஆபத்தும்கூட
நேரிட்டன. இந்தியர்களின் உரிமைக்காக
வும், அநீதிச் சட்டங்களை எதிர்த்தும் பல
போராட்டங்கள் செய்து வெற்றி பெற்றார்.
போனிக்ஸ் என்ற இடத்தில் ஆசிரமம்



பாண்டி. ஸ்ரீ. கே. ராமநாதன் (ஒர்க்ஸ் மானேஜர்)
அவர்களின் குமாரத்தி. ஆறுவது வகுப்பு மாணவி.
வியாசப் போட்டியில் பரிசு பெற்ற
இன்னொரு குழந்தை

ஒன்று ஏற்படுத்தி அதில் பலருக்கு ஆதரவு
தந்தார்.

பின்னர் இந்தியா திரும்பியதும், அது
வரையில் பேச்சுடன் இருந்த காங்கிரஸ்
மகாசபைக்கு தலைமை தாங்கி செயல் முறை
யில் நடத்தினார். ஆங்கில அரசாங்கத்தை
எதிர்த்து கிலாபத் இயக்கம், உப்புச் சத்யாக்
கிரகம், அன்னியத்துணி பிஷ்காரம், தனி
நபர் சத்யாக் கிரகம், 1942-ம் வருட இயக்
கம் முதலியவற்றை நடத்தினார். அப்
போராட்டங்களின் பயனாக 1947-ம் வருடம்
ஆகஸ்டு மாதம் 15-ம் தேதி நாட்டிற்கு சுதந்
திர அந்தஸ்து கிடைத்தது. ஆனால் மறு
ஆண்டு 1948-ம் வருடம் ஜனவரி மாதம்
30-ம் தேதி நாதாராம் கோட்சே என்னும்
வெறியனால் சுடப்பட்டு விண்ணுலகம்
அடைந்தார்.

உலகில் தோன்றிய பெரியோர்கள்,
அரசியல், சமூகம், பக்தி முதலியவை ஏதா
வது ஒன்றில் சீர்திருத்தவாதிகளாய் இருந்
தனர். ஆனால் மகாத்மாவோ அரசியல்,
சமூக சீர்திருத்தவாதியாகவும், பக்திமார்க்
கத்தையும் அன்பையும் போதிப்பவராகவும்
இருந்தார். இம்மாதிரி மகான்கள் பல்லா
யிரம் ஆண்டுகளுக்கு ஒரு முறையே தோன்
றக் கூடும்.

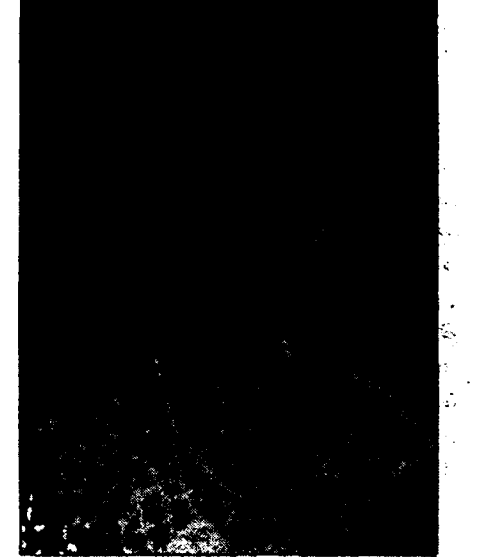
ஒரு அரசியல் எவ்வளவு சிறந்ததாயி
னும், அது அன்னிய அரசாங்கமாய் இருந்
தக் கூடாது என்றார். அரசியலில் சுதந்தி
ரத்தை அடைய சாத்வீக சட்ட மறுப்பு,
சத்தியாக் கிரகத்தைப் போதித்தார். இம்சை
இல்லாமல் தவறான சட்டங்களுக்குக் கீழ்
படியக் கூடாது என்றார். மற்றொருவரை
எதிரியாகக் கருதாமல் நேசிக்கவேண்டும்
என்றார். அதே சமயம் அஹிம்சைவாதி
உயிருக்கும் துணிந்தவராய் இருக்கவேண்டு
மென்றார்.

இந்தியாவில் உள்ள 6 கோடி தாழ்ந்
தப்பட்ட மக்களை அரும்பாடு பட்டு மேல்
நிலைக்குக் கொண்டு வந்தார். மற்றவர்

களுக்கு நிகராக உரிமைகள் வாங்கித்தந்தார்.
ஆலயங்களில் பிரவேசிக்க உரிமை வாங்கித்
தந்தார். இந்துக்களும் முஸ்லிம்களும் ஒரே
குடும்பத்தவர்கள், கடவுள் ஒருவரே, மத
வேற்றுமையால் விரோதம் பாராட்டக்
கூடாது என்றார். அன்பு மார்க்கத்தையும்
போதித்தார். தினம் காலை, மாலை பிரார்த்
தனைக் கூட்டங்களில் தமது கருத்துக்களை
வெளியிட்டார்.

பெண்கள், கல்வி, சேவை முதலியவை
களில் முன்னேறவேண்டும் என்றார். மிக
நல்லொழுக்கம் உள்ளவர்களாய் இருக்க
வேண்டும். சுற்பைக் காக்க உயிரையும்
விடத் தயாராக இருக்கவேண்டும் என்றார்.
நகைகள் மேல் ஆசை கூடாது. அவற்றைப்
பொதுப்பணிகளில் செலவிட வேண்டும்
என்றார். மதுபானம் செய்வது அறவே
கூடாது. கக்கசு சுத்தம் செய்வது முதல்
எல்லாத் தொழில்களும் சிறந்ததே. அவை
களைச் செய்யப் பழகவேண்டும். சுய முயற்
சியால் நாமே நம் தேவையைப் பூர்த்தி
செய்யவேண்டும் என்றார். அதற்கு அடை
யாளமாக கைராட்டினத்தை முன்னுக்குக்

கொண்டு வந்தார். இவர் போதனைகளின்
படி நாம் நடந்து நம் நாட்டையும் சமூகத்



ராதா. ஸ்ரீ. வி. ராமச்சந்திர ராவ், (பர்ச்சேஸ்
ஆபீஸர்) அவர்களின் குமாரத்தி. ஐந்தாவது
வகுப்பு மாணவி. வியாசப் போட்டியில்
பரிசு பெற்ற மற்றொரு குழந்தை

தையும் மேல் நிலைக்குக் கொண்டுவருவதே
நாம் இவருக்குச் செய்யும் சேவை ஆகும்.

மெட்கெம் செய்திகள்

உபநயனம்—சிரஞ்சீவி ராமச்சந்திரன்

மேட்டூர் கெமிகல்ஸ் பிரதம அகென்ஸ்
டண்ட் ஸ்ரீ. K. K. தர்மராஜன் அவர்கள்
பிப்ரவரி 17-ம் தேதி, ஞாயிற்றுக்கிழமை
யன்று தன் ஜேஷ்ட புத்திரன் ராமச்
சந்திரனுக்கு உபநயனம் செய்வித்தார்.
கெமிகல்ஸ் சிப்பந்திகள் அனைவரும், மேட்
டூரில் உள்ள உத்தியோகஸ்தர்கள் யாவரும்
வந்திருந்து இவ்வைபவத்தை சிறப்பித்தனர்.

இதனை ஒட்டி ஒரு வாரம் அவர் இல்லத்
தில், ப்ரஹ்மஸ்ரீ அனந்தராம திசுதிதர்
அவர்களால் 'ஸ்ரீமத் பாகவதம்' கால
கேசுபம் சிறப்பாக நடைபெற்றது.

மஹா ருத்ர ஜபம்: ஊலக கேசுமத்தை
முன்னிட்டு வேதாத்யயனம் செய்யும் பெரி
யோர்களின் உதவியால் பிப்ரவரி 18 முதல்
23 வரை மஹா ருத்ர ஜபம் கெமிகல்ஸ்
காலனியில் செய்யப்பட்டது.

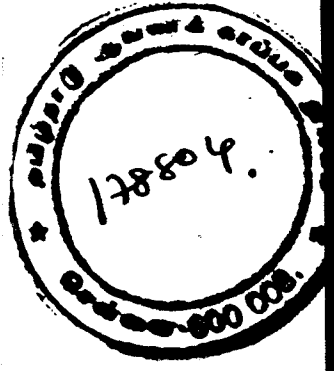
72 6M, 11/11/11
40

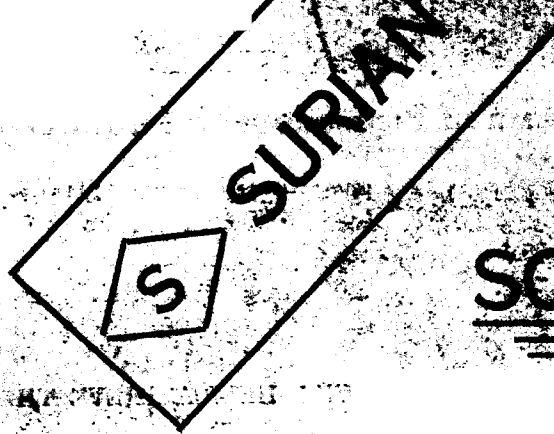


மஹா ருத்ரா ஜபம் : ஸ்ரீ. கே. கே. தர்மராஜன் அவர்கள் இல்லத்தில் நடைபெற்றது.



கே. கே. தர்மராஜனின் ஜேஷ்ட புத்திரன் சிரஞ்சீவி ராமச்சந்திரனின் உபநயன வைபவத்தை ஒட்டிய ஆசீர்வாதக் காட்சி.





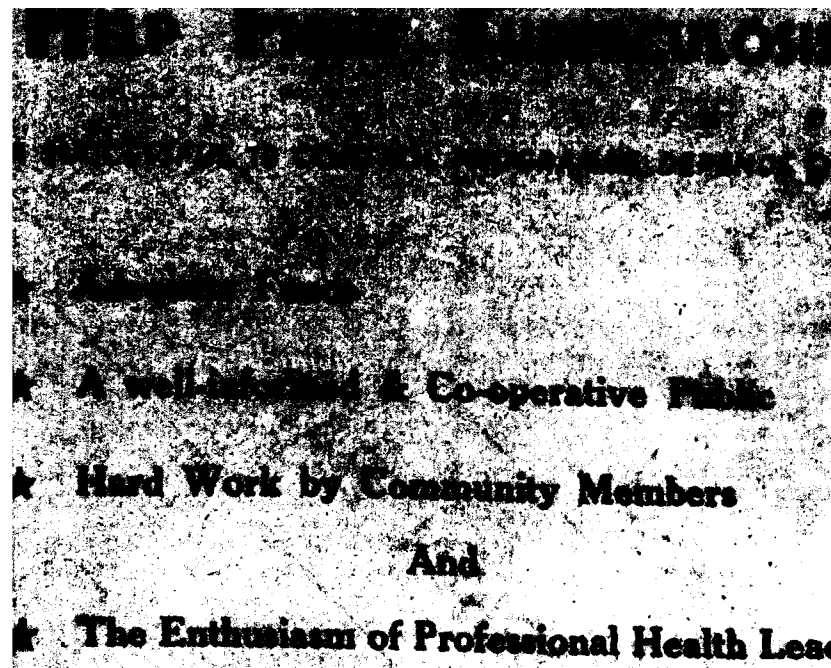
SOAP

Manufactured by :

KUMARAN SOAP WORKS,

SALES DEPOTS:

COIMBATORE	KARUR	TRICHY
503, Rengai Gonda Street.	Mettu Street.	203, Bir Bellary



- ★ A well-informed & Co-operative Public
- ★ Hard Work by Community Members
- And
- ★ The Enthusiasm of Professional Health Leaders.

THE TB SEAL SALE CAMPAIGN WILL HELP ACHIEVE THEM
PLEASE BUY IN LARGE NUMBERS THESE ONE ANNA TB SEAL

(Seals Available from the local Hon. Secretary)

*Space kindly donated by the Mettur Chemical & Industrial Corporation, Limited,
Mettur Dam.*

if

*You have any chemical or chemical
engineering problems do let us know.
We may be in a position to solve
them, for we have, behind us, a
wealth of experience, as consultants
on plant layout, equipment design,
and product formulation.*

SINGMASTER & BREYER

METALLURGISTS AND CHEMICAL ENGINEERS

GRAYBAR BUILDING

420, LEXINGTON AVENUE—NEW YORK 17, N.Y.

more and more

of

less and less

A FINE record of service, that is ours, even as pioneers.

During the critical war years and after, how well and how hard we strove to help Indian industry, friends know ... that chapter now belongs to history.

More than ever before, in the past, we are now better equipped — with the additions we have recently made to our production facilities — to offer to industry more and more of the less and less ... of chemicals in short supply

CAUSTIC SODA
BLEACHING POWDER
HYDROCHLORIC ACID
LIQUID CHLORINE
FERRIC CHLORIDE



**THE METTUR CHEMICAL &
INDUSTRIAL CORPN. LTD.**

METTUR DAM R.S...SALEM DT.

Managing Agents:

SESHASAYEE BROS. LTD.,
TIRUCHIRAPALLI

Sole Selling Agents:

THE ALLIED INDUSTRIAL
DISTRIBUTORS LTD.

120 Armenian Street, Madras 1.



PAPER



SOAP



TEXTILE
BLEACHING



VEGETABLE
OIL REFINING



CHLORINATION
OF WATER



PUBLIC HEALTH &
SANITATION